



Improving the Arctic Mean Sea Surface with CryoSat-2 Data

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TITLE: Improving the Arctic Mean Sea Surface with CryoSat-2 Data

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ABSTRACT BODY: A fundamental basis for estimating short and long-term changes in the sea surface is a reliable mean sea surface (MSS). Existing MSS models, derived from satellite radar altimetry, generally lack observations above 82 degrees latitude making high Arctic sea surface change estimates unreliable.

Most current MSS models use ICESat data, geoid models, ocean circulation models, or a combination of these to extrapolate the MSS above 82 degrees latitude. This approach makes the MSS models unsuited for deriving sea surface anomalies from short-term observations like airborne campaigns (e.g. operation IceBridge).

The new state of the art DTU13MSS is a global high-resolution MSS that includes retracked CryoSat-2 data and thereby extends the polar data coverage up to 88 degrees latitude. Furthermore, in the sea-ice covered areas, the SAR and SARin feature of the altimeter on-board CryoSat-2 increases the amount of useable observations dramatically compared to conventional altimeters like ENVISAT and ERS-1/2. Finally the continuous time-series, below 82 degrees latitude, has been extended to cover more than 20 years compared to the 17 years use for the DTU10MSS model.

A comparison between DTU13MSS and DTU10MSS show an improvement of more than 20 cm between 82 and 88 degrees latitude. For the first time the three years of retracked CryoSat-2 data will, in combination with DTU13MSS, allow reliable estimation of the trend and annual variations in the high Arctic Ocean sea surface height.

KEYWORDS: 4556 OCEANOGRAPHY: PHYSICAL Sea level: variations and mean, 1640 GLOBAL CHANGE Remote sensing, 0754 CRYOSPHERE Leads, 1635 GLOBAL CHANGE Oceans.

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